WHAT WE CLAIM ARE:

1. A micro lens array comprising:

a transparent substrate having a plurality of lenses formed on one principal surface of said substrate; and

a positioning member coupled to said substrate and having a plurality of guide pin insertion holes.

2. A micro lens array according to claim 1, wherein said substrate and said positioning member have a fitting structure allowing said substrate and said positioning member to be fitted in together and to be mounted or dismounted.

3. A micro lens array according to claim 2, wherein said fitting structure has a pin and a pin holding hole for holding said pin.

4. A micro lens array according to claim 3, wherein said pin holding hole has a taper on a pin guiding opening side.

5. A micro lens array according to claim 1, wherein said plurality of guide pin insertion holes all gradually increase a size toward the one principal surface of said substrate.

6. A micro lens array according to claim 1, wherein further comprising:

an optical fiber array having positioning guide pin guiding holes; and

guide pins to be inserted into said guide pin insertion holes and said guide pin guiding holes.

7. A micro lens array according to claim 1, wherein:

said plurality of lenses are disposed in line in such a manner that a line interconnecting centers of said plurality of lenses is a straight line on the one principal surface;

another principal surface of said substrate is formed with a slanted plane for directing light incident upon said plurality of lenses and reflected therefrom in a direction different from an array direction of said plurality of lenses; and

said plurality of guide pin insertion holes are formed on both sides of the lens array including said plurality of lenses, centers of said plurality of guide pin insertion holes being set to positions displaced from said straight line by an amount corresponding to a displacement of an optical axis from each lens center caused by said slanted plane.

8. A micro lens array comprising:

a transparent substrate having a plurality of lenses formed on one principal surface of said substrate; and

a coupling plate made of metal and having a stacking region to be stacked on the one principal surface and a non-stacking region extending continuously with said stacking region and not to be stacked on the one principal surface, said stacking region having a transparent window corresponding to said plurality of lenses and said non-stacking region having a plurality of guide pin insertion holes.

9. A micro lens array according to claim 8, wherein said coupling plate is fixed to said substrate.

10. A micro lens array according to claim 9, wherein said plurality of guide pin insertion holes are all gradually increase a size toward a principal surface of said coupling plate on a side opposite to said substrate.

11. A micro lens array according to claim 9, wherein

said plurality of lenses are disposed in line in such a manner that a line interconnecting centers of said plurality of lenses is a straight line on the one principal surface;

another principal surface of said substrate is formed with a slanted plane for directing light incident upon said plurality of lenses and reflected therefrom in a direction different from an array direction of said plurality of lenses; and

said plurality of guide pin insertion holes are formed on both sides of the lens array including said plurality of lenses, centers of said plurality of guide pin insertion holes being set to positions displaced from said straight line by an amount corresponding to a displacement of an optical axis from each lens center caused by said slanted plane.

12. A micro lens array according to claim 9, wherein further comprising:

an optical fiber array having positioning guide pin guiding holes; and guide pins to be inserted into said guide pin insertion holes and said guide pin guiding holes.

13. A micro lens array comprising:

a transparent substrate having a plurality of lenses and a plurality of fitting pins made of metal, respectively formed on one principal surface of said substrate; and

a coupling plate made of metal and having a stacking region to be stacked on the one principal surface and a non-stacking region extending continuously with said stacking region and not to be stacked on the one principal surface, said stacking region having a transparent window corresponding to said plurality of lenses and a plurality of fitting holes corresponding to said plurality of fitting pins, said non-stacking region having a plurality of guide pin insertion holes, and said coupling plate being mounted on said substrate by fitting said plurality of fitting pins in said plurality of fitting holes in a state that said stacking region is stacked upon the one principal surface.

14. A micro lens array according to claim 13, wherein said plurality of fitting holes are all formed gradually increasing a size toward a principal surface of said coupling plate on a side of said substrate.

15. A micro lens array according to claim 13, wherein said plurality of guide pin insertion holes are all formed gradually increasing a size toward a principal surface of said coupling plate on a side of said substrate.

16. A device with guide pin insertion holes, comprising:

a substrate made of nonmetal and formed with through holes for forming the guide pin insertion holes; and

a metal layer covering an inner wall of each of said through holes to form a guide pin insertion hole having a size smaller than a size of said through hole.

17. A device with guide pin insertion holes according to claim 16, wherein:

a metal plate having a pin insertion hole having a size smaller than a size of said through hole is disposed on one of two principal surfaces of said substrate, said metal plate covering a peripheral area of one opening end of said through hole and said pin insertion hole is aligned in position with said through hole; and

said metal layer is formed continuously with said metal plate and covers a peripheral area of another opening end of sid through hole on the other principal surface of said substrate.

18. A device with guide pin insertion holes according to claim 16, wherein said metal layer is formed covering peripheral areas of an opening of said through hole on both two principal surfaces of said substrate.

19. A method of manufacturing a micro lens array comprising steps of:

(a) preparing a transparent substrate formed with a plurality of lenses on one principal surface of said substrate;

(b) forming a plating seed film on the one principal surface of said substrate, said plating seed film surrounding said plurality of lens;

(c) forming a coupling plate made of metal on said plating seed film by selective plating, said coupling plate having a transparent window corresponding to said plurality of lenses and a plurality of guide pin insertion holes; and

(d) removing said substrate stacked on said plurality of guide pin insertion holes so as to make open said plurality of guide pin insertion holes on a side of said substrate.

20. A method of manufacturing a micro lens array according to claim 19, wherein said step (c) plates metal on said plating seed film in an opening of a plating area defining mask including a plating area defining pillar, said plating area defining pillar being spaced apart from said plating seed film and having a diameter same as a diameter of a guide pin.

21. A method of manufacturing a micro lens array according to claim 20, wherein said step (b) does not form said plating seed film under and around said plating area defining pillar.

22. A method of manufacturing a micro lens array according to claim 20, wherein after said plating seed film is formed, said step (b) forms a thin resist pattern under and around said plating area defining pillar.

23. A method of manufacturing a micro lens array comprising steps of:

preparing a transparent substrate formed with a plurality of lenses on one principal surface of said substrate;

forming a plurality of recesses in the one principal surface of said substrate by selective etching; and

polishing another principal surface of said substrate bottoms of said plurality of recesses to change said plurality of recesses to a plurality of guide pin insertion holes.

24. A method of manufacturing a micro lens array according to claim 23, further comprising a step of, after said plurality of recesses are formed, making an opening of each of said plurality of recesses gradually increase a size at an upper level by selective etching before the other principal surface of said substrate is polished.

25. A method of manufacturing a micro lens array comprising steps of:

(a) preparing a transparent substrate and a coupling plate, said transparent substrate having a plurality of lenses and a plurality of fitting pins made of plated metal, respectively formed on one principal surface of said substrate, and said coupling plate made of plated metal and having a stacking region to be stacked on the one principal surface and a non-stacking region extending continuously with said stacking region and not to be stacked on the one principal surface, said stacking region having a transparent window corresponding to said plurality of lenses and a plurality of fitting holes corresponding to said plurality of fitting pins, said non-stacking region having a plurality of guide pin insertion holes; and

(b) mounting said coupling plate on said substrate by fitting said plurality of fitting pins in said plurality of fitting holes in a state that said stacking region is stacked upon the one principal surface.

26. A method of manufacturing a micro lens array according to claim 25, wherein said step (a) forms a plating seed film and a plating area defining mask on a dummy substrate, and plates metal on said plating seed film.

27. A method of manufacturing a micro lens array according to claim 26, wherein said step (a) plates metal on said plating seed film in an opening of a plating area defining mask including a plating area defining pillar, said plating area defining pillar being spaced apart from said plating seed film and having a diameter same as a diameter of a guide pin.

28. A method of manufacturing a micro lens array according to claim 27, wherein said step (a) does not form said plating seed film under and around said plating area defining pillar.

29. A method of manufacturing a micro lens array according to claim 27, wherein after said plating seed film is formed, said step (b) forms a thin resist pattern under and around said plating area defining pillar.

30. A method of manufacturing a device with guide pin insertion holes, comprising:

preparing a substrate made of nonmetal and formed with through holes for forming the guide pin insertion holes;

disposing a metal plate having a pin insertion hole having a size smaller than a size of said through hole is disposed on one of two principal surfaces of said substrate, said metal plate covering a peripheral area of one opening end of said through hole and said pin insertion hole is aligned in position with said through hole, and disposing hole forming pins made of nonmetal, and disposing hole forming pins in such a manner that while said hole forming pins are inserted into said pin insertion holes of said metal plate, said hole forming pins are extended toward the other of the two principal surfaces of said substrate via said through holes;

performing a metal plating process by using said metal plate as a plating seed layer to form a metal layer made of plated metal and covering an inner wall of each of said through holes, in a state that said metal plated is disposed in a manner described above and said hole forming pins are disposed in a manner described above; and

dismounting said hole forming pins from said pin insertion holes of said metal plate and said metal layer to provide said metal layer with the guide pin insertion holes having a size corresponding to a size of said hole forming pins.

31. A method of manufacturing a device with guide pin insertion holes according to claim 30, wherein said pin insertion holes of said metal plate to be used in said step of disposing said metal plate gradually increase a size toward a surface of said metal plate opposite to a side of said through holes.

32. A method of manufacturing a device with guide pin insertion holes,

comprising:

forming a plating seed layer on one principal surface of a fixing plate;

adhering a substrate made of nonmetal and formed with through holes for forming guide pin insertion holes to said plating seed layer via an adhesive layer and fixing said substrate to said fixing plate;

forming a resist layer smaller than a size of each of said through holes and thicker than a thickness between two principal surfaces of said substrate in each of said through holes, in a state that said substrate is fixed to said fixing plate, and selectively removing said adhesive layer around said resist layer by using said resist layer as a mask to expose a portion of said plating seed layer in a pattern surrounding said resist layer and leave a portion of said adhesive layer under said resist layer;

by using as a mask said resist layer, the portion of said adhesive layer under said resist layer, said adhesive layer and said substrate, plating metal on said plating seed layer to form a metal layer made of plated metal and covering an inner wall of said through holes;

providing said metal layer with the guide pin insertion holes by removing said resist layer and the portion of said adhesive layer;

removing said plating seed layer to separate said fixing plate from said substrate having said metal layer provided with the guide pin insertion holes.

33. A method of manufacturing a device with guide pin insertion holes according to claim 32, wherein said substrate to be used in said step of fixing said substrate to said fixing plate has each of said through holes gradually

increasing a size toward a principal surface of said substrate on a side opposite to a side where said substrate is fixed to said fixing plate.